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NOTES ON A COLLECTION OF MOLLUSKS FROM NORTH WESTERN LOUISIANA, AND HARRISON COUNTY, TEXAS.

By T. Wayland Vaughan.

INTRODUCTORY REMARKS.

For several years, while resident in Louisiana, I busied myself in trying to bring together as good a local collection of the mollusks of the region as possible. During the past summer, while at work on the *Louisiana Geological Survey,* I continued my collecting, obtaining many specimens of land-shells, and a few fresh-water shells. Through the kindness of Mr. George Williamson, of Grand Cone, La., of Mr. O. B. Lewis, of Burk Place, and Messrs J. D. and J. E. Bailey, of Summerfield, coupled with my own efforts, it is likely that I have obtained more species from this section than anyone else. In view of this it seems highly probable that a few notes on this collection would be of passing interest to conchologists.

The largest part of the section that these remarks apply to is included between Ouachita River on the east, a line through Alexandria on the south, and the Texas and Arkansas lines, but I have transgressed these lines in speaking of a few specimens collected to the south of it in St. Landry Parish, and have included in the discussion, as the title denotes, Harrison County, Texas.

This list undoubtedly does not contain all of the species found in this region, for a few species originally described from this section have not been rediscovered. Undoubtedly, many more species of *Cyrenidæ, Pupidæ,* and other families will be found later. It is worthy of notice that the collecting of my friends and myself have brought to light no species of that large family *Pleuroceridæ* (*Strepomatidæ*) that is found in such large numbers in the southern States east of the Mississippi River. Some species of this family have been noted from Louisiana.

In the identification of my species I have to acknowledge gratefully the assistance of Messrs Wm. H. Dall, Chas. T. Simpson, Wm. A. Marsh A. A. Hinckley, R. E. Call, and Dr. V. Sterki. Either Mr. Simpson or Mr. Marsh, or both, have examined specimens of most of my *Unionidæ,* and Dr. V. Sterki has examined nearly all of my *Pupidæ.* It has been my good fortune to examine a good many of Lea's and Conrad's types at the Smithsonian Institution and at Philadelphia Academy of Natural Sciences, and I have been able to use the works found in the library of the Museum of Comparative Zoology at Harvard University, so that I think most, if not all, of the identifications are entirely trustworthy.

To my friends who have aided me in collecting, and to those who have helped in the matter of identification, my sincere thanks are extended. To Dr. Otto Lerch, Geologist of Louisiana, my thanks are especially due for enabling me to do collecting throughout the summer.

NOTES ON THE TOPOGRAPHY AND CLIMATE OF NORTHWEST LOUISIANA.

In order that the physical surroundings of the mollusks herein noted may be better understood, it appears to be justifiable that a few notes on the topography and climate of the section will be in place.

Probably there is no portion of the United States so misunderstood from a topographic standpoint as northwest Louisiana. Most of the people who visit the state go to New Orleans, which stands from eleven to forty feet above the sea level, in almost the flattest portion of the inhabitable part of the State, and immediately jump to the conclusion that the whole State a jungle of swamps and alligators. It is undeniable that a large portion of the State stands very little above mean tide-water, and that swamps and alligators do abound, but the northwestern portion of Louisiana is moderately hilly. The mean level of the country, from Shreveport to Monroe, is about 400 feet above the sea level, the elevation reaching on the hills from 150 to 300 feet higher. If one starts at Shrevesport, which is between 198 and 227 feet above the sea, and goes to Monroe, he will, after passing out of flat river bottom, cross a strip of level country about ten to fifteen miles wide, that forms a kind of shelf alongside the river bottom. After this one goes into the hills—topped with red-sandy clay, red-sandy or red-clay soils. These hills are the products of erosion out of a past plain, and Mr. L. C. Johnson compares them to the buttes of the west. Some of them rise rather abruptly, others gently; some attaining a height of from 80 to 150 feet above the general level of the hill lands. One hill called Leatherman's Mountain, is said by Mr. Johnson to reach an elevation of 700 feet, or about three hundred feet above the general level. The vegetation of these hill lands is mostly oaks, where the soil is not very sandy, but when much sand is present, the short-leaf pine (*Pinus mitis*) abounds.

As one proceeds south from Arcadia, at something like thirty miles distant from that place, the red sandy clays give place to pure white sands, that bear luxuriant forests of the long leaf pine (*Pinus palustris*), though as one nears Alexandria, which is 85 miles further south than Arcadia, the sand is somewhat redder, but still contains little or no clay. In the country whose surface is made up of these deep white sands, the lands wash badly, and hills rise very steeply to a height of 75 to 100 feet above their bases. These sandy hills are all clothed with an almost uninterrupted forest of that most majestic tree, the long leaf pine. It is absent only in the small "hollows" between the hills, and in the calcareous prairie lands.

Scattered through the southern part of Bienville Parish, through Winn, Grant, and Catahoula Parishes, are spots of calcareous lands, that are usually prairies of several acres in extent. These lands usually belong to the *Jackson* and *Vicksburg* horizons, though the spot of the lime-lands in northern Nachitoches Parish belongs to the *Claiborne*, *Ostrea sellæformis* being found there in great abundance. There is a hill of crystalline limestone near Winfield, La., that is *Cretaceous*. These lime-lands seem to present especially good conditions for the development of the land shells. By far the majority of the species of the land shells collected were found associated at one place or another with these calcareous lands. The need of lime for the growth of the shells easily accounts for this. *Bulimulus dealbatus* and *Helicina orbiculata* were found in abundance only on these soils.

All of the chief streams, large bayous, as well as rivers, flow in a general southerly direction. The two main streams are Red River and Ouachita River. "A dividing ridge, frequently noticeable only on closest inspection, runs almost central between the rivers, dividing the Ouachita and Red River system eastward and westward" (Lerch). Thus, certain of the bayous flow into Ouachita River, such as Cypress and Corney, and others flow into Red River, such as Dorcheat, Black Lake Bayou, Bayou Bodeau, etc. Bayou Pierre is on the west side of Red River.

One of the most noteworthy things about these streams is that they are subject to great periodical overflows. Thus, in the summer of 1891, I remember rolling up my trousers to my knees and wading across Bayou Dorcheat, but in the spring of the following year, when Red River was so overflowed as to wash away much of the railroad track, steamboats took passengers down the Dorcheat and up Red River to Shreveport.

Another feature of Red River is the flat, basin-like reservoirs, called lakes, that are found on either side of it. In many cases it is impossible to find any banks to these lakes, so gradually does the land slope toward them. There is a stream always flowing through the middle of them, and, in consequence of an insufficient outlet, the water accumulates at the lower portion of the stream. The high water in these lakes is caused either by back-water from the river, or by a large amount of water being brought by the stream that opens into them.

The bottoms or beds of these lakes and bayous are usually very soft, and collecting is thus rendered abominable, it often being a continuous process of wallowing in the mud. Sometimes a firm foundation may be found to stand on, but it is the exception. In Red River one usually sinks waist-deep in the soft mud. The bottom of the smaller creeks is usually somewhat firm. The small creeks in the sandy hills of the long leaf pine region have beautiful, firm, white sand bottoms, and the water is so clear that the fishes can be seen darting hither and thither, even when they are of considerable depth.

As to climate, the following data taken from Dr. Otto Lerch's "Preliminary Report upon the Geology of the Hills of Louisiana, etc." (1892), may be of interest.

Mean Temperature at Shreveport, La., for each Month the past Twenty Years, from 1871 to 1890, inclusive.

Jan.	Feb.	Mar.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual mean.
45.8	51.5	58.1	66.1	73.3	79.9	82.7	81.5	74.8	65.4	54.2	49.5	65.2

The latest frost in the spring ranges from Feb. 14 to April 9; it usually occurs the latter part of March or within the first few days of April. The earliest frost ranges from October 7 to November 18—it usually comes toward the latter part of October. The highest temperature in the summer ranges from 91° F. to 107° F.; ordinarily it is between 98° F. and 104° F. In winter the temperature rarely falls below 12° F.

Total Precipitation at Shreveport, La. Average of each Month the past Twenty Years, from 1871 to 1890, inclusive.

Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual mean.
4.93	4.62	4.74	5.55	4.47	3.69	3.74	2.05	4.30	3.52	4.88	4.81	4.30

As one goes south and nearer the seashore from Shreveport, corresponding changes in the temperature, etc., take place.

LAND MOLLUSKS.

LIMACIDÆ.

ZONITES.

Zonites (*Hyalina*) *arboreus* Say, extremely abundant, being found under damp rubbish throughout the section.

Zonites (*Hyalina*) *indentatus* Say, is not so abundant as the preceding species, but is found almost everywhere the conditions of snail life are satisfied.

Zonites (*Hyalina*) *miniscullus* Binney, is found rather commonly throughout the section.

Zonites (*Conulus*) *Sterkii* Dall, was collected under damp leaves near Mt. Lebanon.

Zonites (*Conulus*) *fulvus* Draparnaud, is found in many places, but is not very abundant.

Zonites (*Mesomphix*) *lævigatus* Pfeiffer, is found in many localities, and was collected in abundance in trash found near branches and along the creek bottoms.

Zonites (*Mesomphix*) *demissus* Binn., was collected at several places in Bienville Parish, at Grand Cane, and on the calcareous prairies of Winn Parish. Not very abundant.

Zonites (*Mesomphix*) *intertextus* Binney, abundant under trash along creek bottoms. The specimens are usually more depressed than the figure in W. G. Binney's Bulletin 28 of the U. S. Nat. Mus., but the specimens collected in Red River bottom in Rapides Parish were quite as much elevated.

LIMAX.

Limax, sp. A species of *Limax*, that seems to be *L. campestris* Binney, was collected in the early part of 1891 abundantly around Mt. Lebanon after light showers. The extremely dry summer of '91 seemed to have almost exterminated them, so that after that spring I could not find any more specimens, and did not determine the species certainly.

Limax flavus Linn. was collected under some logs near the depot at Washington, St. Landry Parish.

PHILOMYCIDAE.

PHILOMYCUS.

Philomycus carolinensis Bosc. Abundant in damp places.

HELICIDÆ.

PATULA.

Patula alternata Say, abundant throughout the section.

Patula perspectiva Say, was collected at Columbia, near Rosefield, in Catahoula Parish, and near Ville Platte, in St. Landry Parish. Is not very abundant.

PUNCTUM.

Punctum pygmæum Draparnaud, near Mt. Lebanon. Rare. Dr. Sterki considered a specimen that I sent him this species.

HELICODISCUS.

Helicodiscus lineatus Say, found in many localities. Not very abundant.

POLYGYRA.

Polygyra leporina Gould, found in many localities in small numbers.

Polygyra texasiana Moricand, found near Tullos, La., in calcareous prairie, and in the Red River drift at Shreveport and Alexandria.

Polygyra dorfeuilliana Lea, abundant at Mt. Lebanon, and is found in many other places.

Polygyra espiloca Rav. A single specimen was collected on Catahoula Prairie, and some others were found near Ville Platte.

STENOTREMA.

Stenotrema monodon Rackett, var. *fraternum* Say, found in abundance throughout the section. The variation in size, and degree of compression of the spine is great.

Stenotrema labrosum Bland, calcareous prairie at Tullos, and in the Red River drift at Alexandria.

TRIODOPSIS.

Triodopsis inflecta Say, was collected in a good many places, but is not very abundant.

Triodopsis obstricta Say. I have collected specimens in the river drift at Alexandria and Shreveport. At Alexandria I also found some live specimens. Mr. Geo. Williamson has found the species rather abundant around Grand Cane.

Triodopsis vultuosa Gould, found abundantly around Mt. Lebanon, and in many other localities.

MESODON.

Mesodon thyroides Say. Both the more typical *thyroides* and Gould's variety *bucculentus* are abundant at many localities.

Mesodon albolabris Say. Some specimens, though somewhat small, for this species seem best placed when referred to it. Not abundant.

Mesodon divestus Gould. Grand Cane, La. These specimens do not fit anything else, and Mr. Harper, of Cincinnati, has so determined specimens sent him by Mr. Williamson. Since we are agreed independently, I feel safe in the identification.

BULIMULUS.

Bulimulus dealbatus Say, found by the thousands on the calcareous prairies of Winn and Catahoula Parishes. Mr. Lewis collected it around Burk Place, Bienville Parish.

PUPIDÆ.

STROBILA.

Strobila labyrinthica Say, abundant wherever there is damp trash.

PUPA.

Pupa curvidens Gould, Mt. Lebanon, La., and near Bienville, also from river drift at Alexandria.

Pupa pentodon Say, river drift at Alexandria.

Pupa milium Gould, river drift at Alexandria.

Pupa sp. Calcareous prairie lands, Winn Parish, La.

Pupa fallax Say, found in nearly every portion of the section. Often very abundant.

Pupa armifera Say, throughout the section, but not so abundant as *P. fallax*.

Pupa contracta Say, throughout the section. Abundant.

Pupa procera Gould, rather abundant on the calcareous prairie lands of Winn Parish, found also in the Red River drift at Alexandria.

VERTIGO.

Vertigo ovata Say, river drift at Alexandria.

SUCCINEIDÆ

SUCCINEA.

Succinea avara Say, Mt. Lebanon; calcareous prairie lands of Winn Parish. On these lime prairies dead specimens are found several inches beneath the surface of the ground. I imagine that they crawl into cracks in the ground during the dry summer months and are entombed.

Succinea grovesnorii Lea, Jonesville, Texas; Boyce, La., and Bayou Pierre. These specimens are obtained in the damp rubbish immediately above the water's edge. They seem almost semi-aquatic.

HELICINIDÆ.

HELICINA.

Helicina orbiculata Say, found by the thousands on the calcareous prairies of Bienville, Winn and Catahoula Parishes, and very abundantly in the river drift at Shreveport. This species has a well-established reputation for its variability, and in Louisiana its reputation is well-sustained.

FRESH-WATER SHELLS.

AURICULIDÆ.

CARYCHIUM.

Carychium exiguum Say, found in the damp leaves on the borders of many streams. This form could more appropriately be considered a land shell.

LIMNÆIDÆ.

LIMNÆA.

Limnæa columella Say, abundant in the ponds near Burk Place, La.

Limnæa humilis Say, Bayou Pierre, and Boyce, La.

PLANORBIS.

Planorbis trivolvis Say, var. *lentus* Say, abundant throughout the section.

Planorbis dilatatus Gould, found in nearly all of the smaller streams.

Planorbis bicarinatus Say, in the ponds around Burk Place.

ANCYLUS.

Ancylus obscurus Haldeman, found in nearly all of the smaller streams throughout the section.

PHYSIDÆ.

PHYSA.

Physa heterostropha Say, found in all of the streams and ponds throughout the section.

PALUDINIDÆ.

CAMPELOMA.

Campeloma decisa Say, is as general in occurrence as *Physa heterostropha.* The form called *C. coarctata* by Anthony is found abundantly in many localities. This species is extremely variable, but the forms intergrade too well to separate them into several species.

VIVIPARA.

Vivipara subpurpurea Say, found abundantly in nearly all of the larger streams and lakes. The specimens show great variation, but are too well known to conchologists to need special notice.

Vivipara intertexta Say, Flagon Bayou, Rapides Parish, Lake Satt, pond near Jonesville, Texas. I have specimens from three other localities in Louisiana, showing that the species is widely distributed in the State, but I have never obtained it in large numbers, so it would be considered scarce.

HYDROBIIDÆ.

AMNICOLA.

Amnicolo cincinnatiensis Anthony, Bayous in Claiborne Parish, and Lake Bisteneau. It is extremely abundant in Lake Bisteneau.

Amnicola sayana Anthony, Cross Lake at Shreveport. Not very abundant.

UNIONIDÆ.

UNIO.

Unio anodontoides Lea, is extremely abundant in many of the bayous and lakes. It was collected in Cross Lake, Caddo Lake, Red River at Shreveport, Lake Bisteneau, Corney Bayou, Bayou Pierre, etc. It was found most abundantly in Lake Bisteneau, the species from Red River at Shreveport were the most perfect. Although this species exhibits some variation in size and relative thickness of the shell, the variation is rather slight when compared to the great amount of some other species.

Unio gracilis Barnes, is not very abundant. In Caddo Lake a fine lot of young specimens were collected. It was also found in Cross Lake, Red River (at Shreveport), Dorcheat Bayou, Corney Bayou, Bayou Pierre, and Lake Bisteneau.

Unio purpuratus Lam. This handsome *Unio* is rather abundant. It was collected in Cypress Bayou (Texas), Caddo Lake, Cross Lake, Corney Bayou, Dorcheat Bayou, Bayou Pierre and Lake Bisteneau. The most perfect specimens were in Caddo Lake; here a considerable number of perfect young were obtained. The largest specimen was a dead valve from Dorcheat Bayou, it being about six inches in length. A large number of specimens were collected from little pockets that had been formed alongside Corney Bayou. The characters of this species are very constant.

Unio lævissimus Lea, Caddo Lake, Red River at Shreveport. Rather rare. Some beautiful young were obtained in Caddo Lake.

Unio nigerrinus Lea. Localities: Corney Bayou, Cypress Bayou, La., Dorcheat Bayou and creek near Rosefield. This species is rather abundant. The largest specimens were obtained from Dorcheat Bayou, where the shells, besides being larger than those of the neighboring streams, have thick, somewhat massive, shells.

Unio haleianus Lea. A single specimen was collected by Mr. O. B. Lewis, at Burk Place, in a small creek. I collected a specimen in Castor Bayou, Catahoula Parish, that I take to be of the same species.

Unio mississippiensis Conrad, is abundant in the ponds and creeks throughout the section. It was found in Dorcheat Bayou and in Bayou Pierre, but is usually not abundant in the larger streams. The species does not present very much variation.

Unio hydianus Lea, is found in all of the larger bayous in which I collected—Dorcheat, Corney, etc. The specimens are very numerous. The variation is great, from individuals that are sub-compressed, to those that are very much inflated. There is a marked tendency to become much inflated in old age forms. The number and size of the rays vary much, some specimens have wide rays, others narrow rays, and still others are scarcely rayed at all. This species, on account of its enormous amount of variation, is one of our most attractive and instructive forms.

Unio approximus Lea. A specimen of this species was found in a small creek in Rapides Parish. We think that we are not alone when we consider the difference between *hydianus* and *approximus* almost nominal.

Unio obtusus Lea, was collected by Mr. O. B. Lewis in a branch near Burk Place, in Bienville Parish. Mr. C. T. Simpson so determines a specimen that I sent him, and from Lea's figures and descriptions I would so consider it.

Unio parvus Barnes, is found in a good many of the bayous. It is almost impossible, if not entirely so, to separate this and the three following species, but a good many of my specimens seem undoubtedly *parvus.*

Unio texasensis Lea, abundant everywhere that I collected *Unionidæ,* except in Red River, Cross Lake, and a few very small creeks. These specimens can be gathered by thousands. The variation is enormous, from elongated to rather short; from thin to rather thick shelled, etc.

Unio bairdianus Lea, is considered a synonym of the above. It is abundant in the creeks of the section.

Unio bealei Lea, were collected in the creeks around Mt. Lebanon. This form is extremely close to *texasensis.*

Unio camptodon Say, is found abundantly in the smaller streams throughout northwestern Louisiana. It seems to thrive best in small creeks and brooks that flow moderately rapidly, and have sandy bottoms. This species is so very abundant that, possibly excepting *Unio texasensis,* we are inclined to call it the most abundant species. Its range of variation is extremely great, and from the large suites that we obtained of it and the three following species, it seemed to us that we could trace their intergradation.

Unio declivis Say. Corney and Cypress Bayous in Claiborne Parish, near Mt. Lebanon, and near Jonesville, Texas. Mr. Williamson sent me a specimen with pink nacre.

Unio symmetricus Lea, in the creeks and bayous near Grand Cane. I have a good many specimens through the courtesy of Mr. Geo. Williamson, of Grand Cane. This species and *jamesianus* are, without doubt, synonyms, though a typical *symmetricus* can be distinguished from a typical *jamesianus.* I have seen Lea's types at the U. S. National Museum, and believe these to be pretty typical.

Unio jamesianus Lea, is abundant in the brooks and small creeks around Jonesville, and Port Caddo in Texas. Its habits closely resemble those of *camptodon,* with which its seems to connect by intermediate forms.

Unio lachrymosus Lea, is one of the most abundant of the species found in the section. Specimens were collected in Lake Bisteneau, Caddo and Cross Lakes, and in Bayous Dorcheat and Corney. The specimens are found in large numbers. The amount of variation is considerable, some specimens having a great number of pustules, while others have relatively few. Some specimens are much more compressed than others. The largest and heaviest specimens were from Caddo Lake.

Unio asper Lea, Corney Bayou, is found in other localities most likely; shows some variation in the number of pustules.

Unio pustulosus Lea, is not very abundant. Is found in most of the lakes and principal bayous. It is most abundant in Dorcheat Bayou. The specimens from this place are somewhat more inflated than most of the specimens that I have seen from the more northern States. Some of the variations of *pustulosus* approach very near to *turgidus*, and I am inclined to the opinion that these two forms connect by intermediate examples.

Unio schoolcraftii Lea. Corney Bayou. Not very abundant.

Unio nodiferus Conrad. Corney Bayou. Not very abundant. These specimens seem almost fac-similes of those in the Philadelphia Academy of Natural Sciences collection from Neches River, Texas.

Unio turgidus Lea. Dorcheat Bayou. Somewhat abundant in this stream.

Unio pustulatus Lea. Caddo and Cross Lakes, Lake Bisteneau. It is abundant in the two first lakes. It varies very much in the amount of the development of the pustules.

Unio houstonensis Lea, is found in the three larger lakes and Bayou Pierre.

Unio trigonus Lea. Cross Lake, Bayou Pierre and Dorcheat Bayou. This species and the next two form a most interesting and a somewhat perplexing set of forms.

Unio cerinus Conrad, is found abundantly in nearly all of the bayous and the larger creeks throughout northwestern Louisiana. Many hundreds of specimens were obtained from Corney Bayou. It varies enormously, and undoubtedly grades into the next species.

Unio chunii Lea. Corney Bayou, Dorcheat Bayou, Cross Lake. It is somewhat abundant in Corney Bayou. It varies greatly, sometimes being arcuate on the base, almost hooked as the posterior margin is approached. The sharpness of the posterior ridge from the umbo varies much, as does the amount of inflation of the valves, forming, it seems to me, perfect gradations into *cerinus*.

Unio cuneus Conrad. Corney Bayou. Rare.

Unio cornutus Barnes. Caddo Lake, Cross Lake, Bayou Pierre. Not very abundant, and very constant in its characters.

Unio castaneus Lea. Corney Bayou, Cypress Bayou, Dorcheat Bayou. It is very abundant in these streams. The specimens from the two first are very small and somewhat compressed; those from Dorcheat are the largest that I have ever seen. These latter specimens are much thickened anteriorly are much inflated in that portion, but are compressed posteriorly. The male individuals are rather pointed behind, and the females are truncated.

Unio elegans Lea. Caddo Lake, Cross Lake, Corney Bayou, and Bayou Pierre. Very scarce.

Unio donaciformis Lea, in the larger Lakes and Bayou Pierre. Very scarce.

Unio plicatus Lea. Bayou Pierre. Mr. Williamson sent me the only specimens that seem to me undoubtedly this species.

Unio perplicatus Con. Ouachita River, Bayou Pierre.

Unio multiplicatus Lea. Caddo Lake, Cross Lake, Dorcheat Bayou, Bayou Pierre. The finest specimens were from Cross Lake, near Shreveport. These would rival some of the monsters from Spoon River, Ill., and seem entitled to the name *heros.*

Unio undulatus Barnes, Bayou Pierre. Mr. Williamson has sent me some specimens that seem best placed under this species, though they could, without especial violence, be called *multiplicatus.*

Unio boykinianus ? Lea. Dorcheat Bayou. I collected one specimen that has been so identified by Mr. A. A. Hinckley. I have seen specimens of the species in the Philadelphia Academy, and have looked up Lea's figure, and think that my friend is about as nearly right as can be in some of these delicate matters.

Unio trapezoides Lea, abundant in the larger lakes and bayous. I have also received specimens from the Ouachita River in Union Parish. In Caddo Lake this species is the most abundant. I collected many hundreds there. Some of the largest specimens, however, were from Cross Lake. This species seems to like the larger bodies of water where it has a considerable extent of rather level bottom of somewhat soft mud to dwell in. The characters of this species are, in the main, rather constant. The amount of inflation varies a good deal, as also does the postero-basal angle in sharpness ; and the posterior ridge from dorsal to basal margins varies in its acuteness. There is a considerable variation in the distinctness of the folds, but the trapezoidal outline, the black epidermis, the purple nacre remain constant, the variations being of essentially one type of structure.

Unio tuberculatus Lea. Corney Bayou, Dorcheat Bayou, Bayou Pierre, Cross Lake. It is rather abundant in the two first localities. Some of the specimens from Corney Bayou had the posterior portion very much elongated. Both the purple-nacred and white-nacred varieties were found.

Unio gibbosus Barnes. Corney Bayou. A small, compressed variety was found in great abundance in this stream.

Unio rotundatus Lamarck. Cross Lake, Bayou Pierre. This species is rather rare in Cross Lake, but, judging from the number sent me by Mr. Williamson from Bayou Pierre, it must be very abundant there. It is found abundantly in southern Louisiana. It appears that when northern Louisiana is reached, the northern extension of the species is being approached. A specimen of this species was collected on the border of Cross Lake, September 26, 1891, supposed to be dead. It was laid upon my table to await a convenient opportunity for washing and putting away. On November 18, I tried to prize the valves open, but they would not yield. The animal was cut out, and its heart was seen to be still beating. The mussel had lived almost two months on my table, out of the water.

MARGARITANA.

Margaritana confragosa Say. Caddo Lake, Lake Bisteneau, Cross Lake, Corney Bayou, Bayou Pierre. The species is rare everywhere, but is most abundant in Caddo Lake, where I collected about one dozen specimens.

Margaritana complanata Barnes. Corney Bayou. Rare. Out of a great many thousand specimens of *Unionidæ* from Corney, I obtained only two of this species.

ANODONTA.

Anodonta tetragona Lea. Dorcheat and Corney Bayous. Not abundant.

Anodonta stewartiana Lea. Lake Bisteneau and in a pond near Jonesville, Texas. Rare.

Anodonta gigantia Lea. Pond near Shreveport, and in a pond in Claiborne Parish. Near Shreveport, in a sequestered pond, into whose surface the sunbeams filtered through the willows, I made a rich "find" of a bushel of these *Anodontas.* They were the most beautiful specimens of the genus that I have seen, many being a most beautiful but subdued green—all as thin as egg-shells.

Anodonta corpulenta Cooper. Caddo Lake, pond near Shreveport, Bayou Pierre. Not abundant. This *Anodonta*, with the two mentioned just above, have a wonderfully close resemblance, and I would not like to undertake to never get them mixed up. I am inclined to believe that they are *naturally* mixed up, and that it is *artificial* to try to draw sharp lines between them.

Anodonta opaca Lea. Cypress Bayou, Black Lake Bayou, Corney Bayou, ponds around Jonesville, Texas; around Grand Cane; and I have received some good specimens from southern Arkansas. The finest specimens were from Jonesville, some being about six inches long, and with an epidermis of a beautiful polished mahogany color. This is by far the most common of the *Anodontas* in the section. At one time I had two hundred and fifty specimens from *one* bayou. The variation is enormous. The color is from mahogany to green, the form may vary from an elongated oval to a short oval, or the base may be arcuate, the size may vary in what appears to be adult specimens from two to five inches. Yet in spite of all this variation with a good suite of specimens, one readily sees that it is all the same species, for every intermediate form exists.

Anodonta suborbiculata Say. Caddo Lake. Very rare. This is such a handsome species that one wishes it could be found wherever he collects, but he is disappointed in Louisiana. In Caddo Lake a few small specimens are found.

CYRENIDÆ.

PISIDIUM.

Pisidium variable Prime, found in many of the small branches. Near Port Caddo, Texas, not far from Cypress Bayou, small peat mosses have formed between the bases of some of the hills. These mosses are fed by springs. In small holes over this moss hundreds of this *Pisidium* can be collected by pulling up the moss and other aquatic or semi-aquatic plants and examining their roots.

SPHÆRIUM.

Sphærium contractum Prime, in the ponds and creeks around Jonesville, Texas, and in Cross Lake, near Shreveport.

Sphærium fabale Prime, in nearly all of the smaller streams of northwest Louisiana, and is often found in the greatest abundance. It is the most common species of the genus in the section.

Sphærium transversum Say. Dorcheat Bayou and Lake Bisteneau.

There are, undoubtedly, many other species of the *Cyrenidæ* in the section. We have collected immature examples of other species, but there is too much doubt attached to their identification to justify entering them on this list.

Cambridge, Mass., July 16, 1893.